

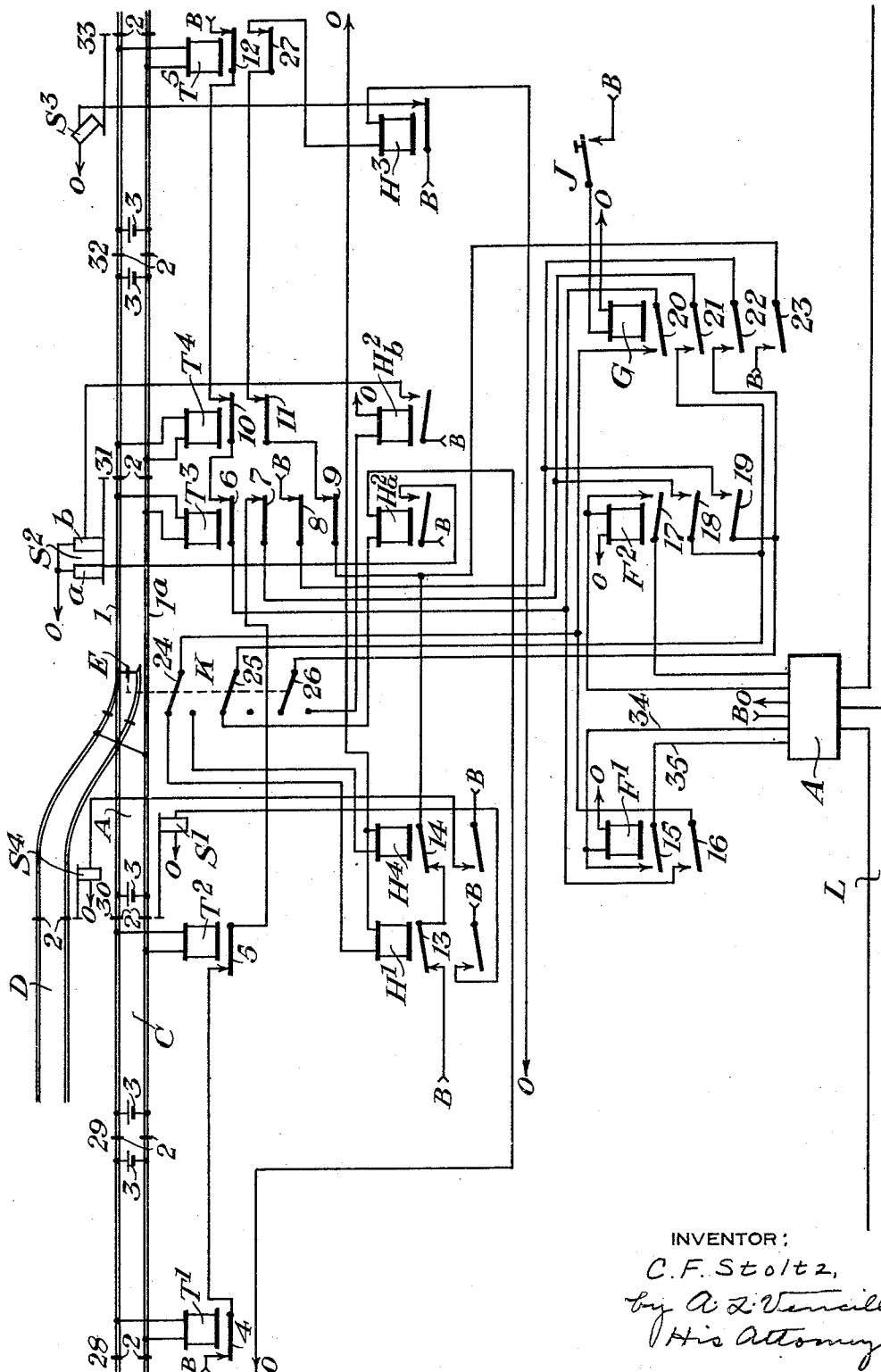
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RAILWAY TRAFFIC CONTROLLING APPARATUS

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RAILWAY TRAFFIC CONTROLLING APPARATUS

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My invention relates to railway traffic controlling apparatus, and particularly to apparatus of the type comprising railway signals controlled jointly by track circuits and by remote controlled selectors.

One feature of my invention is the provision, in apparatus of this character, of means for removing the signals from control by the selector in the event of failure of the selector or of the transmission line which controls it, whereby the signals will then function as automatic signals.

I will describe one form of apparatus embodying my invention, and will then point out the novel features thereof in claims.

The accompanying drawing is a diagrammatic view showing one form of apparatus embodying my invention.

Referring to the drawing, the reference characters 1 and 1^a designate the track rails of a stretch of railway track along which traffic moves in both directions. This stretch comprises a main track A, and a side track D connected with the main track by a switch E. The rails of the main track are divided by insulated joints 2 to form a plurality of sections, 28—29, 29—30, etc., and each track section is provided with a track circuit comprising a track battery 3 and a track relay T. The track circuit for section 30—31 includes the rails of the side track D up to the fouling point.

Located at the point 30 is a signal S¹ governing traffic moving toward the right, and located at the point 31 is another signal S² governing traffic moving toward the left. The latter signal comprises two arms *a* and *b*, the former of which is effective when the switch E is in its normal position, and the latter of which is effective when the switch is in its reverse position. Traffic from the side track D into the main track A is controlled by another signal S⁴ located at the point 30. An additional signal S³ is located at the point 33 for governing traffic moving toward the left.

The reference character A designates a selector which is controlled from a remote point, such as a dispatcher's office, over a transmission line L. Associated with the

selector A are two selector relays F¹ and F², which are normally de-energized, but which may be energized by proper operation of the selector A. When the selector is operated in response to the proper key in the dispatcher's office, a pick-up circuit for relay F¹ is closed, which circuit passes from terminal B of a suitable source of current, through the selector A, wire 34, and the winding of relay F¹ to terminal O of the same source of current. A stick circuit for relay F¹ will then become closed, which circuit passes from terminal B, through the selector A, wire 35, front contact 15 of relay F¹, and the winding of relay F¹ to terminal O. Relay F¹ will then remain energized until the selector is operated to open this stick circuit. Relay F² is controlled by the selector A in a similar manner, but responds to the operation of a different key in the dispatcher's office.

Each signal S is provided with a home relay, designated by the reference character H with the same exponent as that of the signal which it controls. Each signal is controlled by the associated relay H in such manner that the signal will give a stop indication when the relay is de-energized, and a proceed indication when the relay becomes energized. The circuits for the control of the signals by the home relays will be obvious from the drawing, and will therefore require no explanation.

The home relays H are controlled jointly by the selector relays F and the track relays T, as well as by a circuit controller K which is operated by the switch E.

As shown in the drawing, both relays F¹ and F² are de-energized, so that all of the home relays H are deenergized, with the exception of relay H³ which controls signal S³. The circuit for home relay H³ is from terminals B, through back contact 13 of relay H¹, back contact 14 of relay H⁴, front contact 9 of track relay T², front contact 11 of track relay T⁴, front contact 27 of track relay T⁵, and the winding of relay H³ to terminal O. It follows that signal S³ normally gives a proceed indication, whereas, the remaining signals normally indicate stop.

I will now assume that selector A is oper-

ated in such manner as to cause relay F^1 to become energized, and I will also assume that switch E is in the normal position. Home relay H^1 will then become energized by virtue of a circuit which passes from terminal B, through front contact 12 of track relay T^6 , contact 10 of relay T^4 , contact 6 of relay T^3 , contact 16 of relay F^1 , contact 24 of circuit controller K, and the winding of relay H^1 to terminal O. When relay H^1 becomes energized, signal S^1 will be caused to give a proceed indication. If switch E is in the reverse position when relay F^1 becomes energized, home relay H^4 will become energized instead of relay H^1 , the circuit being the same as before up to contact 24 of circuit controller K; the circuit then passes through relay H^4 instead of relay H^1 . This will cause the signal S^4 to give a proceed indication.

In either event, that is, if either relay H^1 or H^4 becomes energized, the circuit for home relay H^2 will be opened at back contact 13 of relay H^1 or back contact 14 of relay H^4 , so that signal S^2 will be caused to give a stop indication.

I will now assume that the selector A is operated to energize selector relay F^2 . If switch E is in the normal position, relay H^2_a will become energized, the circuit being from terminal B, through contact 4 of track relay T^1 , contact 5 of track relay T^2 , contact 7 of track relay T^3 , contact 18 of relay F^2 , contact 25 of circuit controller K, and the winding of relay H^2_a to terminal O. This will cause arm a of signal S^2 to give a proceed indication. If switch E is in the reverse position instead of the normal position, relay H^2_b will become energized, and this will cause arm b of signal S^2 to give the proceed indication. In either event, the circuit for relay H^3 will not be disturbed, and, consequently, signal S^3 will still give a proceed indication.

The circuits for the home relays H^1 , H^4 , H^2_a and H^2_b , are provided with shunts around the front contacts of the selector relays F^1 and F^2 , which shunts include front contacts of a normally de-energized cut-out relay G. Relay G is provided with a circuit which includes a normally open manually operable circuit controller J, so that when this circuit controller is closed the relay will be energized. Assuming now that both selector relays F^1 and F^2 are de-energized, and that circuit controller J is closed to cause relay G to become energized, and also assuming that all of the track relays shown in the drawing are energized, relay H^1 will become energized by virtue of a circuit which is the same as before, except that it includes front contact 20 of relay G instead of front contact 16 of relay F^1 . Relay H^2_a will also become energized by virtue of a circuit which is the same as before except that it includes front contact 21 of relay G instead of front contact 18 of relay F^2 . Signal S^1 and

arm a or signal S^2 will then both give proceed indications. The circuit previously traced for relay H^3 will then be opened at contact 13 of relay H^1 , but this relay will become energized by virtue of an auxiliary circuit which passes from terminal B, through contact 23 of relay G, contact 9 of relay T^3 , contact 11 of relay T^4 , contact 27 of relay T^5 , and the winding of relay H^3 to terminal O. It follows that signal S^3 will then give a proceed indication in spite of the fact that relay H^1 is energized. Of course, if switch E is in the reverse position, relay H^4 will be energized instead of relay H^1 , and relay H^2_b will be energized instead of relay H^2_a , with the result that signal S^4 and arm b of signal S^2 will give proceed indications.

In the event of failure of the selector A, or of the transmission line L, or of the apparatus in the dispatcher's office for controlling this line, circuit controller J may be closed by hand, thereby removing the signals from control by the selector A, so that these signals will function as automatic signals controlled by the track relays T. In this connection it should be noted that under normal operating conditions it is impossible for signals S^1 and S^3 or for signals S^4 and S^2 to simultaneously give proceed indications, thereby effecting what is known in systems of this character as "traffic locking." When the cut-out relay G is energized, this traffic locking is removed, because the back contacts 13 and 14 of relays H^1 and H^4 are eliminated from the control of relay H^3 , with the result that signal S^3 may give a proceed indication simultaneously with signal S^1 or S^4 .

Although I have herein shown and described only one form of apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In combination, a section of railway track, a track circuit including a track relay for said section, a signal governing traffic through said section, a remote controlled selector associated with said signal, means for normally controlling said signal by said track relay and said selector, and manually operable means for removing said signal from control by said selector whereby the signal may function as an automatic signal in the event of failure of the selector or of the line over which it is controlled.

2. In combination, a section of railway track, a track circuit including a track relay for said section, a signal governing traffic through said section, a remote controlled selector associated with said signal, means for normally controlling said signal by said track relay and said selector, a normally de-

energized cut-out relay, means effective when said relay is energized to remove said signal from control by said selector, and a circuit for said relay including a normally open manually operable circuit controller.

3. In combination, a section of railway track, a track circuit including a track relay for said section, a signal governing traffic through said section, a remote controlled selector associated with said signal, a normally de-energized selector relay, means controlled by said selector for energizing said selector relay, a controlling circuit for said signal including a front contact of said track relay and a front contact of said selector relay in series, a branch for said signal circuit around said selector relay contact and including a front contact of a normally de-energized cut-out relay, and manually operable means for energizing said cut-out relay to remove said signal from control by said selector.

4. In combination, a section of railway track, a track circuit including a track relay for said section, a signal governing traffic through said section, a remote controlled selector associated with said signal, a normally de-energized selector relay, means controlled by said selector for energizing said selector relay, a controlling circuit for said signal including a front contact of said track relay and a front contact of said selector relay in series, a branch for said signal circuit around said selector relay contact, and manually operable means for closing said branch whereby said signal may be removed from control by said selector.

5. In combination, a stretch of railway track, a track circuit including a track relay for said stretch, two signals governing traffic in opposite directions along said stretch, a remote controlled selector, means for normally controlling said signals by said selector and by said track relay, and manually operable means for removing said signals from control by said selector whereby the signals may function as automatic signals.

6. In combination, a stretch of railway track, a track circuit including a track relay for said stretch, two signals S^1 and S^3 governing traffic in opposite directions along said stretch, a remote controlled selector, a normally de-energized selector relay, means controlled by said selector for energizing said selector relay, a normally de-energized home relay for signal S^1 , means for normally controlling said home relay by said selector relay and by said track relay, means for normally controlling signal S^3 by a back contact of said home relay and by said track relay, and manually operable means for removing said home relay from control by said selector relay and for removing signal S^3 from control by said home relay.

7. In combination, a stretch of railway

track, a track circuit including a track relay for said stretch, two signals S^1 and S^3 governing traffic in opposite directions along said stretch, a remote controlled selector, a normally de-energized selector relay, means controlled by said selector for energizing said selector relay, a normally de-energized home relay for signal S^1 , means for normally controlling said home relay by said selector relay and by said track relay, a circuit for signal S^3 including a front contact of said track relay and a back contact of said home relay in series, a normally de-energized cut-out relay, manually operable means for energizing said cut-out relay, and means operating when said cut-out relay is energized to remove said home relay from control by said selector relay and to close a shunt in the circuit for signal S^3 around the back contact of said home relay.

8. In combination, a stretch of railway track, a track circuit including a track relay for said stretch, two signals S^1 and S^3 governing traffic in opposite directions along said stretch, a remote controlled selector, a normally de-energized home relay signal S^1 , means for normally controlling said home relay by said selector and by said track relay, means for normally controlling signal S^3 by said track relay and by a back contact of said home relay, and manually operable means for removing said home relay from control by said selector and removing signal S^3 from control by said home relay.

9. In combination, a stretch of railway track, a track circuit including a track relay for said stretch, two signals S^1 and S^3 governing traffic in opposite directions along said stretch, a remote controlled selector, a normally de-energized home relay for signal S^1 , means for normally controlling said home relay by said selector and by said track relay, means for normally controlling signal S^3 by said track relay and by a back contact of said home relay, a normally de-energized cut-out relay, manually operable means for energizing said cut-out relay, and means operating when said cut-out relay is energized to remove said home relay from control by said selector and to remove signal S^3 from control by said home relay.

In testimony whereof I affix my signature
CARL F. STOLTZ.